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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 09/929,703 | 08/13/2001 | Ulrich Friedrich | 4219 | 8886 |

21553 7590 10/31/2005

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| EXAMINER | |
|---|---|
| AGHDAM, FRESHTEH N | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2631 | |

DATE MAILED: 10/31/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/929,703 | FRIEDRICH, ULRICH | |
| | Examiner | Art Unit | |
| | Freshteh N. Aghdam | 2631 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *28 September 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *13* is/are allowed.

6)☒ Claim(s) *1-3,5,7,10,14 and 16-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 August 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Continued Examination Under 37 CFR 1.114*

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 9/28/2005 has been entered.

**Applicant's Argument(s):** Applicant argues in page 14, the combination of Piirainen and Hwang do not teach or suggest "the modulation indices represent additional information in addition to the information items represented by the information symbols".

Examiner Response: Hwang teaches assigning two different modulation indexes respectively to two bipolar symbols (+1 and –1) during any ith signaling interval, wherein the information symbols convey data, and the modulation indices convey additional information in addition to the data (i.e. represents the data type that is bipolar and it is either +1 or –1); and the receiver evaluates the modulated signal to obtain the data and the additional information (Hwang et al; Pg. 1450, Col. 2; Pg. 1451, Col. 1 and 2; Pg. 1455, Col. 2).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 3, 5, 16-19, 21-22, 27, 28, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Piirainen (WO 99/33237), and further in view of Hwang et al (IEEE JOURNAL ON SELECTED AREAS IN COMMUNICATIONS, VOL. 7, NO. 9, DECEMBER 1989).

As to claims 1,16-19, 21-22, 28, and 32, Piirainen teaches a method for transmitting signals comprising assigning different modulation indices to signals with different data rates (Pg. 2, Lines 6-17); modulating a signal using frequency modulation; and transmitting the modulated signal through the antenna 224 (Fig. 2). Piirainen is silent about assigning a different modulation index to each of the information symbols; the information symbols convey data, and the modulation indices convey additional information in addition to the data; and the second transceiver evaluates the modulated signal to obtain the data and the additional information. Hwang teaches assigning two different modulation indexes respectively to two bipolar symbols (+1 and –1) during any ith signaling interval, wherein the information symbols convey data, and the modulation indices convey additional information in addition to the data (i.e. represents the data type that is bipolar and it is either +1 or –1); and the receiver evaluates the modulated

signal to obtain the data and the additional information (Hwang et al, Pg. 1450, Col. 2; Pg. 1451, Col. 1 and 2; Pg. 1455, Col. 2). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Hwang with Piirainen in order to provide an additional degree of freedom in choosing indices with better performance (Pg. 1450, Col. 2).

As to claims 3 and 27, Hwang teaches information symbols are modulated and transmitted in successive time intervals one after another (Fig. 1). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Hwang with Piirainen in order to transmit and receive signals digitally to be less sensitive to environmental distortions.

As to claim 5, Hwang teaches simultaneously transmitting an information symbol and a subsequent one of the information symbols that follows the selected one of the information symbols (Fig. 1; Pg. 1451, Col. 1; Pg. 145, Col. 2; Pg. 1452, Col. 2). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Hwang with Piirainen in order to provide an additional degree of freedom in choosing indices with better performance (Pg. 1450, Col. 2).

Claims 2, 24, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Piirainen and Hwang et al, further in view of Scott (US 5,832,022).

As to claims 2, 24, and 25, Piirainen and Hwang teaches all the subject matters claimed above, except for alongside the frequency and phase, the amplitude is modulated as the characteristic physical variable of the carrier signal. Scott, in the same field of endeavor, teaches various CPM (Continuous Phase Modulation) techniques

including Superimposed Quadrature Amplitude Modulation wherein the amplitude is modulated as the characteristic physical variable of the carrier signal (Col. 1, Lines 12-20). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Scott with Piirainen and Hwang in order to modulate a signal before transmission.

Claims 7 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Piirainen and Hwang et al, further in view of J.P. Fonseka (IEEE ELECTRONICS LETTERS 2nd September 1999 Vol. 35 No.18).

As to claim 7, Piirainen teaches a method for transmitting signals comprising assigning different modulation indices to signals with different data rates (Pg. 2, Lines 6-17); modulating a signal using frequency modulation; and transmitting the modulated signal through the antenna 224 (Fig. 2). Piirainen is silent about assigning a different modulation index to each of the information symbols; and not only the modulation indices but also respective period lengths of modulation periods differ respectively from one another to define additional information symbols. Hwang teaches assigning two different modulation indexes respectively to two bipolar symbols (+1 and –1) during any ith signaling interval (Hwang et al, Pg. 1450, Col. 2; Pg. 1451, Col. 1 and 2; Pg. 1455, Col. 2). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Hwang with Piirainen in order to provide an additional degree of freedom in choosing indices with better performance (Pg. 1450, Col. 2). Fonseka teaches varying both the modulation index and the symbol duration simultaneously (Pg. 1517, Col. 2; Pg. 1518, Col. 1; Table 1 and 2). Therefore, it would have been obvious to

one of ordinary skill in the art to combine the teaching of Fonseka with Piirainen and Hwang in order to achieve significantly higher distances (minimum distance) than ordinary multi-h and multi-T signals (Pg. 1518, Col. 2).

As to claim 20, Piirainen and Hwang teach all the limitations disclosed, except for the first and second information symbols respectively have different durations relative to one another. Fonseka teaches varying both the modulation index and the symbol duration simultaneously (Pg. 1517, Col. 2; Pg. 1518, Col. 1; Table 1 and 2). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Fonseka with Piirainen and Hwang in order to achieve significantly higher distances (minimum distance) than ordinary multi-h and multi-T signals (Pg. 1518, Col. 2).

Claims 10 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Piirainen and Hwang et al, further in view of Beale et al (US 5,946,293).

As to claims 10 and 30, Piirainen and Hwang teach all the subject matters claimed above, except for the first transceiver controls the second transceiver by at least one control signal being a clock signal assigned to an information symbol. Baele teaches transmitting a plurality of symbols in a frame (Fig. 2), wherein the synchronization channel is added at the beginning of each frame to be transmitted to control the reception unit (Col. 1, Lines 58-67). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Beale with Piirainen and Hwang in order to control the receiver both in time and carrier frequency with the stream of synchronization symbols to increase accuracy of the communication system (Col. 1, Lines 65-67).

Claims 14 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Piirainen, Hwang et al, and Beale et al, further in view of Ricci et al (US 6,463,039).

As to claims 14 and 31, Piirainen and Hwang et al teach all the subject matters claimed above, except for the second transceiver has no electronic circuit for clock generation and is a passive transponder that uses the clock signal for local clocking. Ricci, in the same field of endeavor, teaches providing clock signal and power to the passive transponder (Col. 9, Lines 66 and 67; Col. 10, Lines 1-3). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Rucci et al with Piirainen, Hwang, and Beale in order to provide clock signal to the passive transponder for synchronization purposes.

Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Piirainen and Hwang et al, further in view of J.P. Fonseka and Ho (IEEE TRANSACTIONS ON COMMUNICATIONS, VOL. 44, NO. 3, MARCH 1996).

As to claim 29, Piirainen teaches a method for transmitting signals comprising assigning different modulation indices to signals with different data rates (Pg. 2, Lines 6-17); modulating a signal using frequency modulation; and transmitting the modulated signal through the antenna 224 (Fig. 2). Piirainen is silent about assigning a different modulation index to each of the information symbols; modulating information symbols successively in respective successive time intervals onto the carrier signal with one or more of the successive time intervals respectively defining respective successive signal periods bounded between field gaps in the modulated information signal; and not only

the modulation indices but also respective period lengths of modulation periods differ respectively from one another to define additional information symbols. Hwang teaches assigning two different modulation indexes respectively to two bipolar symbols (+1 and –1) during any ith signaling interval (Hwang et al, Pg. 1450, Col. 2; Pg. 1451, Col. 1 and 2; Pg. 1455, Col. 2); and modulating the information symbols successively in respective successive time intervals onto the carrier signal (Fig. 1). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Hwang with Piirainen in order to provide an additional degree of freedom in choosing indices with better performance (Pg. 1450, Col. 2). Fonseka teaches varying both the modulation index and the symbol duration simultaneously (Pg. 1517, Col. 2; Pg. 1518, Col. 1; Table 1 and 2). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Fonseka with Piirainen and Hwang in order to achieve significantly higher distances (minimum distance) than ordinary multi-h and multi-T signals (Pg. 1518, Col. 2). Ho teaches defining respective successive signal periods bounded between field gaps in the modulated information signal with one or more of the successive time intervals (Pg. 341, Col. 1). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Ho with Piirainen, Hwang, and Fonseka in order to enable receiver to extract from the received signal the channel fading gains at regularly spaced instants (Pg. 337, Col. 1).

Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Piirainen and Hwang et al, further in view of the instant application's disclosed prior art.

As to claim 23, Piirainen and Hwang teach all the subject matters claimed above, except for the information symbols having the different modulation indices assigned to represent different types of the information items. The instant application's disclosed prior art teaches information symbols represent different types of information items (Pg. 1, Lines 12; Pg. 2, Lines 15 and 16). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of the instant application's disclosed prior art with Piirainen and Hwang in order to transmit data digitally, which is less complex and distorted.

Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Piirainen, Hwang et al, and Scott, further in view of Landolsi (US 6,570,842).

As to claim 26, Piirainen, Hwang, and Scott teach all the subject matters claimed above, except for the modulation index being defined as the ratio of the maximum amplitude and a consistent amplitude modulation swing of the respective information signal. Landolsi defines the amplitude modulation index as the ratio of the maximum amplitude and a consistent amplitude modulation swing of the information signal (Col. 7, Lines 20-25). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Landolsi with Piirainen, Hwang, and Scott in order to compute the modulation indexes.

***Allowable Subject Matter***

Claim 13 is allowed. The following is an examiner's statement of reasons for allowable subject matter:

As to claim 13, the prior art of record fails to teach a method wherein the modulation index of the control signal is smaller than the modulation index of a data signal formed by others of the information symbols.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Freshteh N. Aghdam whose telephone number is (571) 272-6037. The examiner can normally be reached on Monday through Friday 9:00-5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kevin M. Burd

**KEVIN BURD**
**PRIMARY EXAMINER**

Freshteh Aghdam

October 21, 2005